# Installation Guide

CompuAdd

Drive WDAC 140/160/280/2120 Installation Guide

*WDAC Drives 140/160/280/2120*
*Installation Guide*

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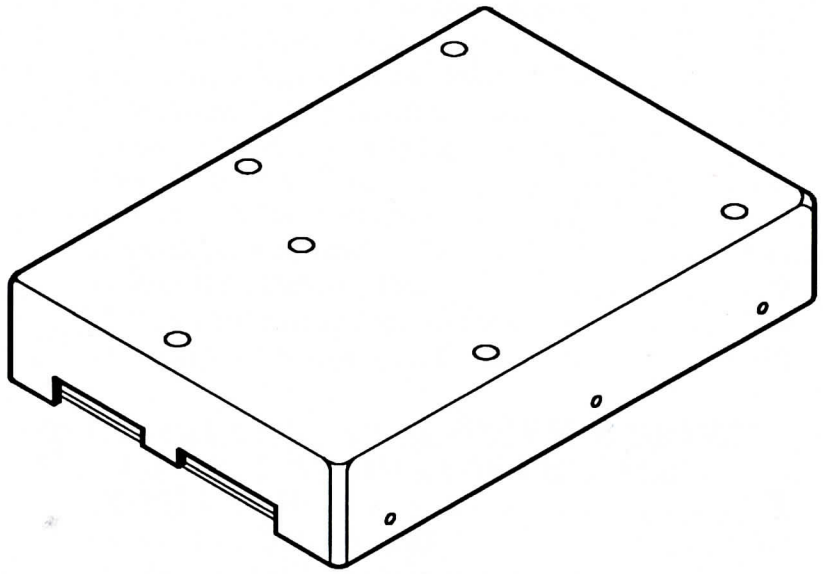
# WDAC IDE Drives 140/160/280/2120

## INSTALLATION GUIDE



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# Chapter 1
## INTRODUCTION

## About IDE Drives

Traditionally, fixed disk drive operations are controlled by a separate circuit board, called a "controller board," that plugs into an expansion slot in the computer's system unit. In contrast, IDE drive manufacturers build the controller electronics into the drive.

The integration of drive and controller electronics matches the controller to the drive characteristics, and eliminates redundant circuitry. This enhances the reliability, performance, and economy of the entire fixed disk-drive subsystem.

This manual explains WDAC IDE drive installation. It covers four drives: WDAC140 with 42.7 MB of storage, WDAC160 with 62.5 MB of storage, WDAC280 with 85.3 MB of storage, WDAC2120 with 125 MB of storage.

## Installing an IDE Drive in Your Computer

Most CompuAdd computer models have a built-in IDE interface. In these computers, the cable from an IDE drive plugs directly into a 40-pin connector on the system board.

Computers without a built-in IDE interface require a separate interface board that plugs into an expansion slot in the computer. This interface board is not the same thing as a standard drive controller board.

If you plan on having two hard drives in your computer, both should be IDE drives.

INSTALLATION NOTES:
If you will be using a built-in IDE interface, refer to your computer system manual for information on configuring your IDE interface. If you purchased an IDE interface board with your IDE drive, consult the manual that came with the interface board to configure and install it.

If you purchased a CompuAdd computer with the drive installed, you may still need to prepare the drive before you can use it to store programs and data. First try starting the computer from the fixed-disk drive (without a floppy). If the screen displays a message asking you to insert a "system" or DOS disk, turn to Chapter 5 for instructions on checking SETUP, and then to Chapter 6 or 7 for instructions on preparing your new drive. Chapter 6 covers preparation using DOS 3, and Chapter 7 covers preparation using DOS 4.

## A Guide to This Manual

Chapter 1 is a general introduction to IDE drives and this manual.

Chapter 2 has instructions for installing the first WDAC IDE drive in a CompuAdd low profile computer.

Chapter 3 has instructions for installing a second WDAC IDE drive in a CompuAdd low profile computer.

Chapter 4 has instructions for installing a WDAC IDE drive in a full profile (standard size) AT-compatible computer.

Chapter 5 has instructions for running the SETUP program that lets your computer recognize your new drive.

Chapter 6 has instructions for preparing the WDAC IDE drive using DOS 3.

Chapter 7 covers drive preparation using DOS 4.

Appendix A lists drive technical specifications.

Appendix B offers troubleshooting tips.





A statement of CompuAdd's warranty is on the inside of the back cover.

## Terminology

**Back up copy**: a spare copy of programs or data, usually on a diskette.

**BIOS**: Basic Input/Output System software that allows a computer to operate and communicate with input/output devices. The computer's system board has BIOS software in ROM chips. Some expansion boards and devices have ROM chips containing extensions to the BIOS software.

**Boot up**: load the operating system into a computer's main memory to make it ready for operation.

**Chip:** an integrated circuit contained in a package with external connectors (such as pins) to allow installation on a circuit board.

**Diskette drive (floppy drive)**: a data-storage device that uses removable, magnetically-coated plastic disks to store information.

**DOS (disk operating system)**: a computer program that controls the loading of application programs into memory, and their access to system resources, such as disk drives and printers.

**DOS prompt**: a visual indication that DOS is ready for you to enter a command. The DOS prompt can be customized, but its unmodified form is the letter of the current default drive followed by the "$>$" symbol.

**[Enter]**: the key labeled "Enter" or "Return" on the keyboard.

**Fixed disk drive (hard disk, hard disk drive, hard drive, Winchester drive)**: a mass-storage device that uses spinning, magnetically-coated rigid platters to store information for fast access. The platters are

sealed from the environment and cannot be removed from the drive enclosure without special equipment.

**High-level format (DOS format)**: the final stage in fixed disk drive preparation. During this process, the operating system does the final organization of the fixed disk drive's information-storage structure.

**IDE (Integrated Drive Electronics) drive**: a fixed disk drive with the drive-controller electronics integrated into the drive itself.

**LED (Light Emitting Diode)**: a low-voltage light frequently used as an indicator light in computers. For example, the drive activity indicator is usually an LED.

**Low-level format (hardware format)**: the process of dividing the disk surfaces into sectors and marking them with sector-identification information.

**Partition (noun)**: an area of a fixed disk drive's storage space marked off for use by a given operating system. Not applicable to diskettes.

**Partition (verb)**: to allocate areas of a fixed disk drive for one or more operating systems.

**ROM**: Read-Only Memory chip, which usually contains fundamental programs for use by the computer.

**System board (main system board, main logic board, motherboard)**: the large flat circuit board on the bottom of the system unit. Usually, other circuit boards plug into the system board.

**System unit (system enclosure, main unit)**: the main component of the computer, which houses the system board, and to which the keyboard, video display, printer, and other peripherals connect.



# CHAPTER 2

## INSTALLING THE FIRST IDE DRIVE IN A COMPUADD LOW PROFILE COMPUTER

If this is the second IDE drive you are installing in this system, refer to Chapter 3. Follow the steps in this chapter to install the first IDE drive.

## 1. Unpack the shipping carton.

**CAUTION**
**The IDE drive circuitry is sensitive to static electricity. Before you handle the drive, discharge any static electricity from yourself by touching a grounded object such as a metal screw on the back of your computer system unit. The computer must be plugged into a grounded outlet to provide a path to ground for static electricity.**

Remove the kit components from the shipping carton, and remove the IDE drive from its protective packing. Please do not throw away the packing material or the shipping box. You may need these items again to prevent physical and static-induced damage if you must ship any part of the kit for warranty repairs.

**CAUTION**
**Rough handling can damage your IDE drive. Though solidly built, it is a precision instrument. Handle it with care.**

Set the drive on a padded surface (anti-static if available) with the labeled side of the drive facing up.

### Factory Surface-Defect List

The factory-surface defect list appears on a sticker on the top of your drive or on a sheet included with the drive. If your drive came with the sticker list, copy the list from the sticker before installing the drive. You only need to copy down the head and cylinder number of each defect. Having the list will allow you to lock out these defects if you ever have drive problems and have to low-level format the drive again. (These defects have already been locked out for you during the low-level format at the factory.)

Note: Most fixed disk drives have some surface defects. They represent a tiny fraction of the total disk capacity.

## 2. Check the drive configuration jumpers.

NOTE: If your new drive will be the only IDE drive in your computer, you should not need to change any of the jumpers on your new drive.

Locate the jumper pins on the back of the drive as shown in Figure 2-1.

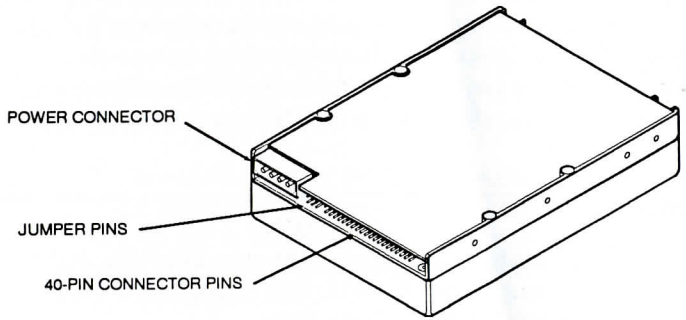


*Figure 2-1. Jumper Block Location at Back of Drive*





Refer to Figures 2-2, 2-3, 2-4 and Table 2-1 for jumper settings.

- With the jumpers set as shown in Figure 2-2, the IDE drive is correctly configured as the only drive in your system (default settings).

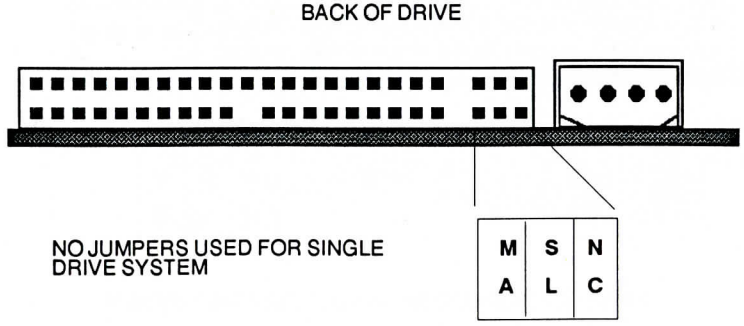


*Figure 2-2. Jumpers for Single Drive System*

- With the jumpers set as shown in Figure 2-3, the IDE drive is correctly configured as the master drive in a dual-drive system.

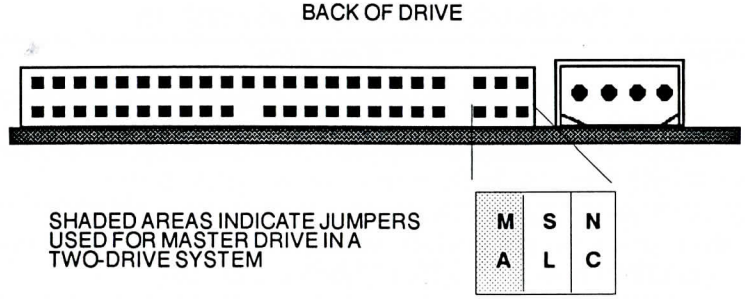


*Figure 2-3. Jumpers for Master in Dual Drive System*

- With the jumpers set as shown in Figure 2-4, the IDE drive is correctly configured as the slave drive in your dual-drive system with a non-Conner Peripheral drive as the master drive.

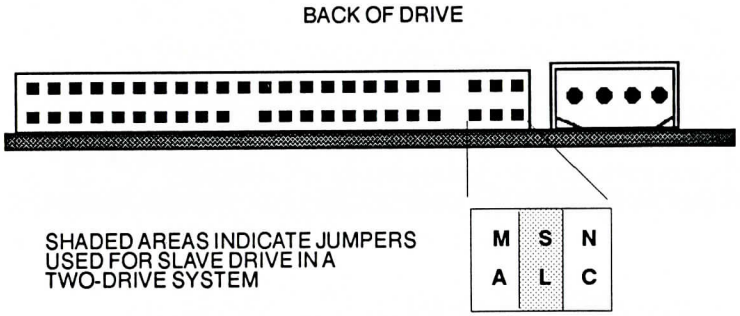


*Figure 2-4. Jumpers for Slave in Dual Drive System*

Figure 2-2, 2-3, and 2-4 illustrate the jumper settings for the four possible drive installations. Table 2-1 provides detailed jumper information for the advanced user.

*Table 2-1. WDAC140 Jumper Definitions*

| Jumper | Description |
|---|---|
| MA | When the jumper is placed across the pins, it indicates that this drive is the master drive in a two-drive system. When the MA jumper is in place, you can use no other jumper (SL and CP must be off). |
| SL | When the jumper is in place, it indicates that this drive is the slave drive in a two-drive system. The MA and SL jumpers should never be in place at the same time. |





## 3. Remove the system-unit cover.

Switch off your computer and unplug it.

**WARNING!**

**Hazardous voltages are present and exposed when operating the computer with the cover removed. To prevent equipment damage and personal injury, never apply power to the computer when its cover is off.**

Remove the six screws, three along each side, at the base of the system unit. Lift the cover slightly and pull it off the back of the system unit as shown in Figure 2-5.

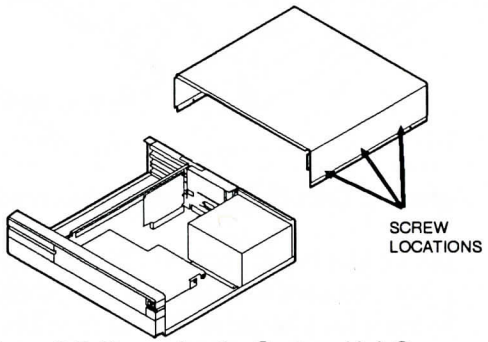


*Figure 2-5. Removing the System-Unit Cover*

## 4. Remove the drive-support plate.

The drive-support plate underneath the diskette drive(s) covers the main fixed disk-drive bay. To install an IDE drive there, you will first need to remove the plate with its attached drives. If you are careful, you can move the detached plate out of the way without disconnecting the drives on top of it.

Remove the three retaining screws from the plate, as shown in Figure 2-6.

Carefully pull the attached drives back out of the front panel as you lift the plate up a few inches. Turn the plate over by gently flipping it toward the back of the system unit, and carefully set it upside-down on top of the power supply. The power supply, shown in Figure 2-6, is the large, shiny-metal box at the back of the system unit.

## 5. Configure the IDE Interface.

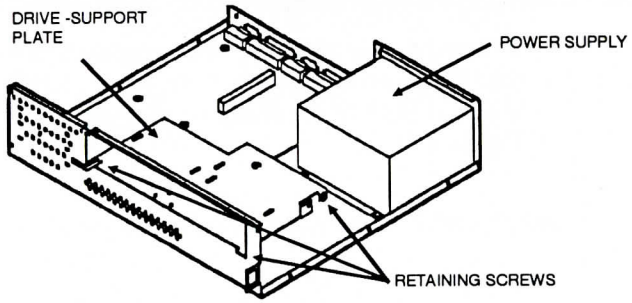


*Figure 2-6. Drive-Support Plate Screw Locations*

Before you install the first IDE drive in your computer, you need to enable the IDE interface and configure it for your drive. The instructions below are for configuring CompuAdd low profile AT-compatible computers, such as the CompuAdd 212, 216, 220, 316s, and 320s. Depending upon its date of manufacture, your computer may have either of the system boards shown in Figure 2-7. For other models or manufacturers, refer to your system user manual.

> Note: Figure 2-7 shows 80286 system board layouts. 80386SX-based system boards are nearly identical, but have a square, rather than a rectangular, socket for the math coprocessor.

Compare the two illustrations to the system board in your computer to determine which matches your sys-





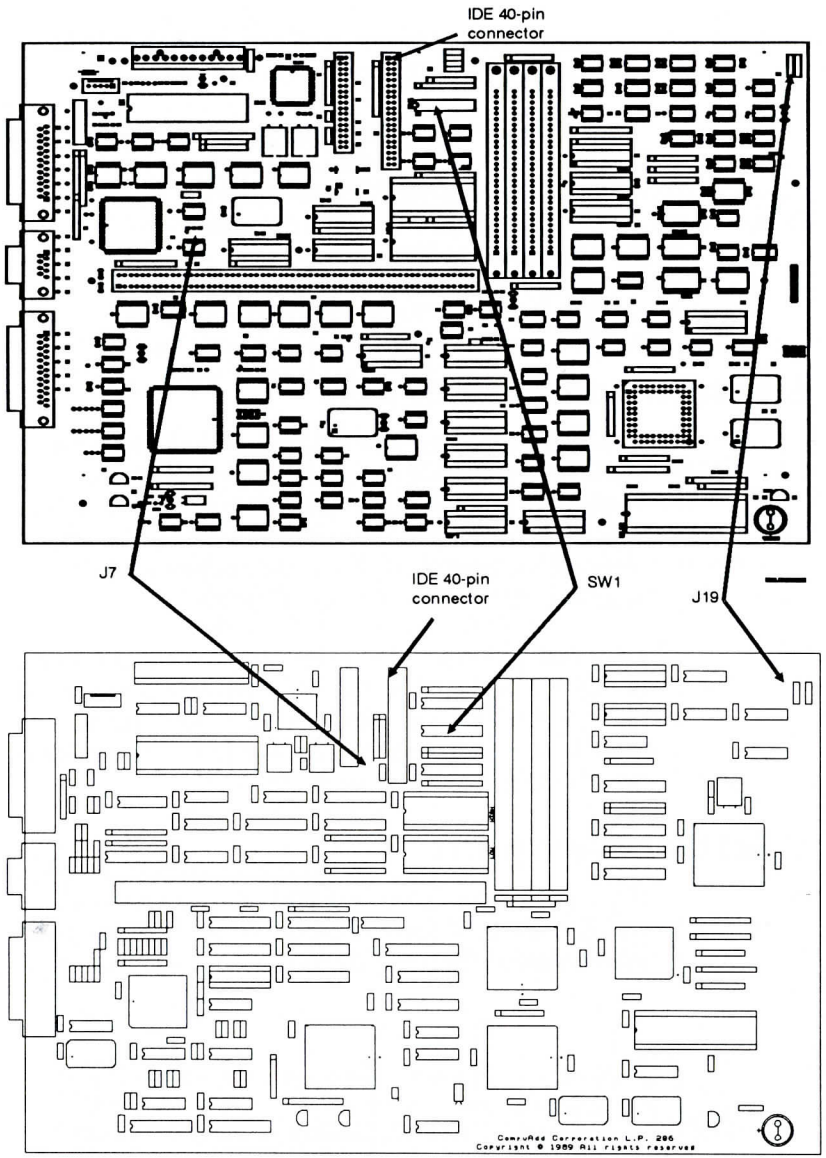


*Figure 2-7. Two Types of Low Profile System Boards (Board at bottom has more large, square chips.)*

tem board layout. Using this illustration to locate the components, do the following:

- On Switch Block 1 (SW1): set switch 6 to ON. This enables the IDE interface.
- At jumper block J7: connect pins 2 and 3 with a jumper. This selects active-low ("negative") IDE reset.

Note: the switch and jumper may already be set correctly.

## 6. Install the drive activity light.

Your drive kit includes an LED drive activity light for use in the CompuAdd low profile computer. If your CompuAdd low profile computer does not have a small light behind the rectangular opening in the upper-right corner of the front bezel, install the one provided. The position of the LED is shown in Figure 2-8.

From inside the case, insert the light between the two prongs behind the hole. Plug the four-hole connector at the end of the wire onto the four pins at J19 in the front right corner of the system board, shown in Figure 2-7. The colored wire goes over pin 1.

## 7. Set the drive in place.

If your new drive is the first IDE drive in your computer, you should put it in the drive bay underneath the drive-support plate, leaving the space above free for

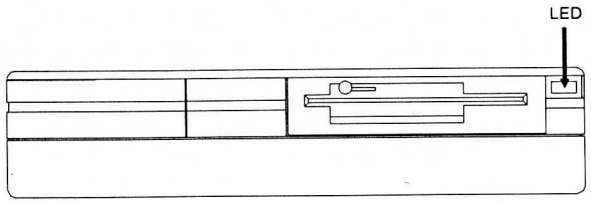


*Figure 2-8. Drive Indicator Light (LED)*





diskette drives. Set the drive in the lower drive bay, but leave it unattached for now.

## 8. Connect the 40-wire cable.

The 40-wire IDE ribbon cable has three 40-pin female connectors on it: one at each end, and one near the middle. The two connectors that are closer together plug into IDE drives, while the other end connector plugs into the computer's 40-pin IDE connector, shown in Figure 2-7. The connectors may be keyed to prevent incorrect attachment.

Look at the back of your IDE drive. You should see a power connector with four large pins on the right side of the drive (Figure 2-9). To its left are two long rows of small pins near the bottom of the drive. Plug the end connector on the ribbon cable into the 40 pins, as shown in Figure 2-9. Make sure the striped side of the cable (pin 1) is near the power-cable connector.

Plug the other end of the 40-wire IDE ribbon cable into your computer board's 40-pin IDE connector. Make sure the striped side of the cable is nearest to pin 1. Refer to Figure 2-7 to see the IDE connector location. Pin 1 is labeled.

## 9. Attach the new drive

Insert the provided screws through both sides of the drive bay into the threaded holes in the IDE drive.

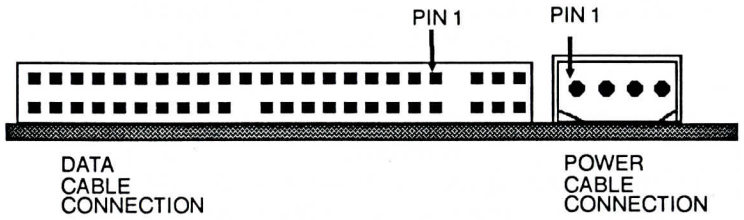


*Figure 2-9. WDAC140 Drive Connections*

## 10. Attach the power cable

Connect one of the four-wire power cables from the computer's power supply to the power connector on the IDE drive, as shown in Figure 2-9. The cable will only fit in the connector when it is oriented correctly.

## 11. Replace the drive-support plate

If you will be installing a second IDE drive immediately after installing the first drive, you can leave the computer disassembled and skip to Chapter 3.

Turn the drive-support plate right-side up by gently flipping it toward the front of the system unit. Lower the drive-support plate, with its attached drives, back into position. Attach it to the computer with the three screws you removed earlier.

Check to make sure that the cables on the drives attached to the plate are still tight. If you are installing a second drive, turn to chapter 3.

## 12. Replace the system-unit cover

Put the cover back on the system unit and reinsert the six cover screws. Plug the computer into an AC outlet.

You have finished installing your IDE drive. Turn to Chapter 5 to run the SETUP program that lets your computer recognize your new drive.



# CHAPTER 3

## INSTALLING A SECOND IDE DRIVE IN A COMPUADD LOW PROFILE COMPUTER

The instructions in this chapter explain how to install a second IDE hard drive in a CompuAdd low profile or compatible computer.

## 1. Unpack the shipping carton.

**CAUTION**
**The IDE drive circuitry is sensitive to static electricity. Before you handle the drive, discharge any static electricity from yourself by touching a grounded object such as a metal screw on the back of your computer system unit. The computer must be plugged into a grounded outlet to provide a path to ground for static electricity.**

Remove the kit components from the shipping carton, and remove the IDE drive from its protective packing. Do not throw away the packing material or the shipping box. You can use these items again if you must ship your drive for warranty repairs. Set the drive on a padded surface (anti-static if available) with the labeled side of the drive facing up.

**CAUTION**
**Rough handling can damage your IDE drive. Though solidly built, it is a precision instrument. Handle it with care.**

### Factory Surface-Defect List

You receive a factory surface-defect list with your drive. These defects have already been locked out for you during the low-level format at the factory. However, you need to lock out these defects if you ever low-level format the drive again. If the list appears on a sticker on the top of the drive and not on a separate sheet, you need to write the head and cylinder number of each defect on a piece of paper before you install the drive.

Note: Most hard drives have some surface defects. They represent a tiny fraction of the total disk capacity.

## 2. Check the drive configuration.

You must configure the second IDE drive as the slave (secondary) drive and the first drive as a master drive. Refer to Chapter 2, step 2, as you complete the following tasks.

### Check the First Drive

If your first drive is a WDAC IDEdrive, verify that you configured it as a master drive. The jumper should be on pin sets MA (Figure 2-3) For other IDE drive models, refer to the drive manual and check jumper settings for a master drive.

### Configure the Second Drive

Place a jumper on pin set SL, the middle pin set (Figure 2-4).

## 3. Remove the system unit cover.

Make sure that your computer is switched off and unplugged.





**WARNING!**

**Hazardous voltages are present and exposed when operating the computer with the cover removed. To prevent equipment damage and personal injury, never apply power to the computer when its cover is off.**

Remove the six screws, three along each side, at the base of the system unit. Lift the cover slightly and pull it off the back of the system unit as shown in Figure 3-1.

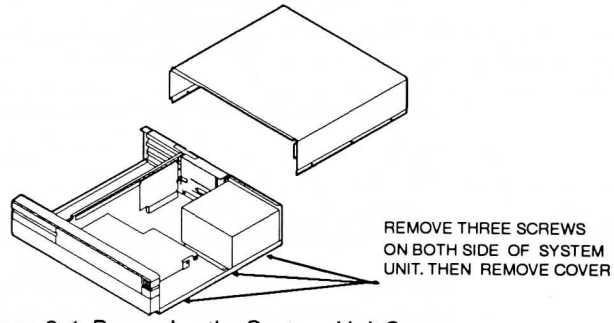


*Figure 3-1. Removing the System-Unit Cover*

## 4. Remove the drive-support plate.

If you are adding a second IDE drive to your computer, you will be mounting the second drive on top of the drive-support plate. However, you still need to remove the plate so that you can insert screws into the new drive from the bottom of the plate.

Remove the three retaining screws from the plate, as shown in Figure 3-2.

Carefully pull the attached drives back out of the front panel as you lift the plate up a few inches. Turn the plate over by gently flipping it toward the back of the

system unit, and carefully set it upside-down on top of the power supply. The power supply, shown in Figure 3-2, is the large, shiny-metal box at the back of the system unit.

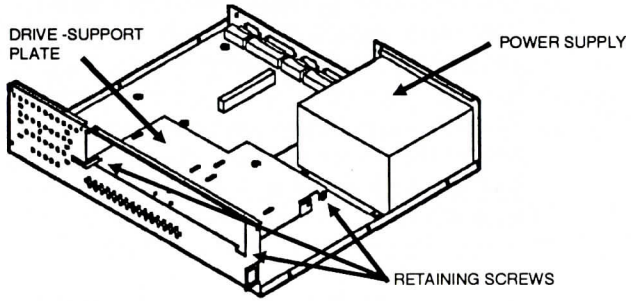


*Figure 3-2. Drive-Support Plate Screw Locations*

## 5. Check the IDE interface on your computer.

Before you installed the first IDE drive in your computer, you should have enabled and configured the computer's IDE interface, as explained in Chapter 2. You do not need to make any changes to the computer's system-board when adding a second IDE drive.

## 6. Attach the new drive to the drive-support plate.

If the drive-support plate is resting upside-down, turn your new IDE drive upside-down (so that its label faces down). Carefully slide it into position under the plate. Align at least two screw-holes on the bottom of the drive with holes in the drive-support plate, and insert the included screws through the plate into the bottom of the drive.





## 7. Replace the drive-support plate.

Turn the drive-support plate right-side up by gently flipping it toward the front of the system unit. Lower the drive-support plate, with its attached drives, back into position. Attach it to the computer with the three screws you removed earlier.

Check to make sure that the cables on the drives attached to the plate are still tight.

## 8. Connect the 40-wire ribbon cable.

To install a second IDE drive in your system, you must have an IDE ribbon cable with three 40-pin female connectors on it: one at each end, and one near the middle.

One end of the cable should be connected to your computer's system board, and the other end should be connected to the IDE drive already in your computer. Plug the unused connector in the middle of the IDE cable onto your new IDE drive.

On the back of your drive is a power connector with four large pins and a long row of small pins to the left (Figure 3-3). Plug the middle connector on the ribbon cable into these 40 pins, shown in Figure 3-3. Make sure the striped side of the cable is nearest to the power-cable connector.

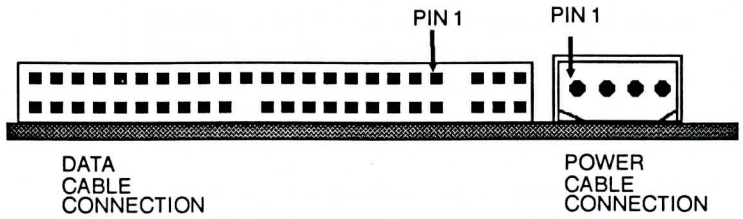


*Figure 3-3. IDE Drive Connections*

## 9. Attach the power cable.

Connect one of the four-wire power cables from the computer's power supply to the power connector on the IDE drive. The cable fits in the connector if it is oriented correctly.

## 10. Replace the system-unit cover.

Put the cover back on the system unit and reinsert the six cover screws. Plug the computer into an AC outlet.

**WARNING!**

**Hazardous voltages are present and exposed when operating the computer with the cover removed. To prevent equipment damage and personal injury, never apply power to the computer when its cover is off.**

You have finished installing your drive. Refer to Chapter 5 to run the computer's SETUP program. This program configures your system to recognize the new drive.



# CHAPTER 4

## INSTALLING YOUR IDE DRIVE IN A FULL PROFILE COMPUTER

This chapter tells you how to install an IDE 140 IDE drive in a full profile (standard-size) computer.

## 1. Unpack the shipping carton.

**CAUTION**

**Electronic components are sensitive to static electricity. Before you handle the kit components, discharge any static electricity from yourself by touching a grounded object such as a metal screw on the back of your computer system unit.**

Remove the components from the shipping carton, and remove the IDE drive from its protective packing. Do not throw away the packing material or the shipping box. You can use them if you need to ship the drive for warranty repairs.

**CAUTION**

**Rough handling can damage your IDE drive. Though solidly built, it is a precision instrument. Handle it with care.**

Set the drive on a padded surface (anti-static if available) with the labeled side of the drive facing up.

### Factory Surface-Defect List

You receive a factory surface-defect list with your drive. These defects have already been locked out for you during the low-level format at the factory. However, you need to lock out these defects if you low-level format the drive again. If the list appears on a sticker on the top of the drive and not on a separate sheet, you need to write the head and cylinder number of each defect on a piece of paper before you install the drive.

Note: Most fixed disk drives have some surface defects. They represent a tiny fraction of the total disk capacity.

## 2. Check the drive configuration.

Note: If your new drive will be the only IDE drive in your computer, do not change any of the jumpers on the new drive – skip to Step 3.

Your IDE drive can be configured as an only drive, a master drive in a two drive system, or a slave drive in a two drive system.

Locate the jumper block at the back of the drive. Then refer to Chapter 2, step 2 to verify jumpers. The remaining parts of this step outline possible configurations.

### One Drive System

Your IDE drive is correctly configured for a single-drive system. There are no jumpers on the pin sets.

### First Drive of a Two-Drive System

If you are using a WDAC IDE drive as the first of a two drive system, then configure the drive as the master drive. Figure 2-3 shows the jumper settings.





### Second Drive of a Two-Drive System

**WDAC IDE** – If you are using the WDAC IDE as the second drive in a two-drive system, then configure the WDACIDE as the slave drive. Figure 2-4 shows the jumper setting - the middle pin set has a jumper on it.

**Other** – If you are using another drive as the second drive in a two drive system, then refer to its documentation for two things. First, determine that it can be used as a slave drive. If so, then configure its jumpers according to its drive documentation.

NOTE: When adding a second drive, make sure the first drive is correctly configured as the master drive.

## 3. Attach the adapter brackets

Most full profile computers have 5-1/4 inch wide drive bays. The IDE drive kit contains adapter brackets that allow you to mount the 3-1/2 inch IDE drive in a 5-1/4 inch bay. The adapters have standard AT-type drive rails molded into their sides, and are marked "L" (left) and "R" (right) for identification purposes.

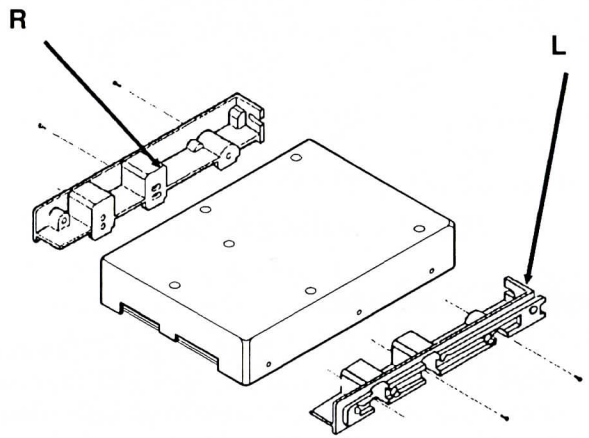


*Figure 4-1. Mounting 5-1/4 Inch Adapter Brackets*

Use the four screws provided to attach the brackets to the drive as shown in Figure 4-1.

## 4. Remove the system-unit cover.

Switch off and unplug your computer. Remove the the screws that attach the cover to the sytem unit. Lift the cover slightly and pull it off the back of the system, as shown in Figure 4-2.

**WARNING!**

**Hazardous voltages are present and exposed when operating the computer with the cover removed. To prevent equipment damage and personal injury, never apply power to the computer when its cover is off.**

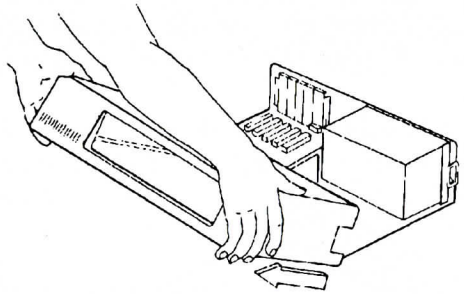

*Figure 4-2. Removing the Cover*

## 5. Enable the IDE interface.

If you purchased an IDE interface board with your IDE drive, refer to the manual that came with the board to install and configure it. Be sure to set **active-low (negative) reset** on the board for your drive.





If you have an IDE interface built-in to your computer's system board, refer to your computer system manual to enable and configure it. Set the following on your computer system board:

- Enable IDE interface
- Active-low (negative) reset

### If You Are Installing a Second IDE Drive

Once you have configured your interface board or computer's system board for the first IDE drive, you do not have to change the configuration when adding a second IDE drive.

## 6. Connect the drive activity light.

Most AT-compatible computers have LED drive activity lights mounted on their front panels, usually near the key lock. Although it will not affect drive operation, you can connect this LED so that it will indicate when the drive is being accessed.

To connect your computer's LED, first locate the LED wire coming out of the front panel of your computer. The LED usually has two wires with a four-hole plug at the end.

If you purchased an IDE interface board, refer to its documentation for the location of the LED connection pins. Connect the plug from the LED onto these pins on the interface board.

If your computer has a built-in IDE interface on its system board, refer to your computer system documentation for the location of the LED connection pins. Connect the plug from the LED onto these pins on the system board.

## 7. Attach the IDE drive.

The most common method of attaching drives to a computer is rail mounting in a 5-1/4 inch drive bay.

Note: If your computer uses a different method for mounting drives, follow the instructions in your computer system manual for mounting new drives. Then resume these instructions with step 8.

Most AT-compatible computers have drive bays with notches or brackets on their left and right sides. Plastic guide rails on each side of a drive slide into these notches or between the brackets. Retaining clips in front of the guide rails keep the drive from sliding out of the drive bay. Alternatively, a screw may be inserted through the side of the bay into the drive to secure it.

Unscrew the retaining clips, if any, beside a vacant half-height drive bay and set them aside for use at the end of this step.

Hold the drive by its sides, with the labeled side facing up. Align the guide rails with the notches or brackets in the drive bay. The tapered ends of the rails should face toward the rear of the drive. Carefully slide the drive into bay, as shown in Figure 4-3.

If you are installing two IDE drives, insert the second drive into a vacant drive bay.

Screw the retaining clips in beside the drive bay(s) so that they block the guide rails, preventing the drive(s) from sliding out. If your computer uses side screws to secure its drives instead, align one of the brass inserts in the drive adapter brackets with a hole in the side of the drive bay. Insert one of the included screws through the side of the drive bay into drive adapter bracket. Do not over-tighten.

## 8. Connect the 40-wire ribbon cable.

The IDE ribbon cable has three 40-pin female connectors on it. One end connector plugs into the computer's 40-pin IDE connector, while the other end





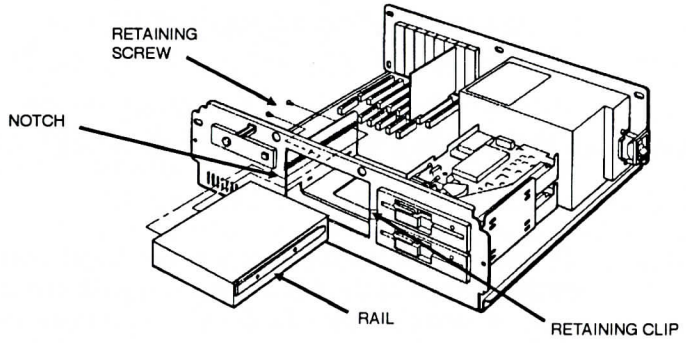


*Figure 4-3. Installing a Drive (Generalized Illustration)*

connector and the middle connector plug into IDE drives.

At the back of your IDE drive. You should see a power connector with four large pins on the right side of the drive. To its left are two long rows of small pins near the bottom of the drive. Plug the end connector on the ribbon cable into the drive's 40-pin connector, as shown in Figure 4-4. Make sure the striped side of the cable is nearest to the power-cable connector, that is towards the right side of the drive.

Plug the other end of the 40-wire ribbon cable into your computer's 40-pin IDE connector. Make sure the striped side of the cable is nearest to pin 1.

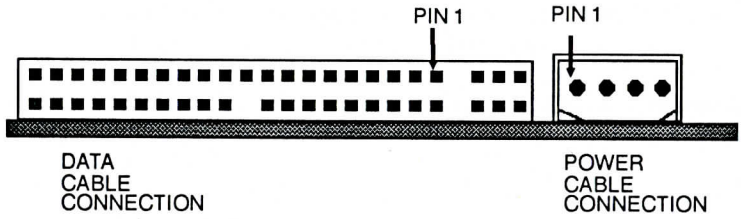


*Figure 4-4. IDE Drive Connections*

### If You Are Installing a Second IDE Drive in Your Computer

One end of the cable should already be connected to your computer's system board, and the end connector on the cable should be connected to the IDE drive already in your computer.

To connect your second drive, find the 40-pin connector on the back of the drive. Plug the middle connector on the ribbon cable into the drive's 40 pin connector, as shown in Figure 4-4. Make sure the striped side of the cable is nearest to the power-cable connector on the right side of the drive.

## 9. Attach the power cable.

Connect one of the four-wire power cables from the computer's power supply to the power connector on the drive, as shown in Figure 4-4. The cable fits in one orientation only. If you have installed two drives, connect a power cable to the second drive also.

## 10. Replace the system-unit cover.

Put the cover back on the system unit and insert the cover screws. Plug the computer into an AC outlet.

You have finished installing your IDE drive. Next you will need to run your computer's SETUP program so that it will recognize your new drive.
Chapter 5 has instructions for running SETUP.



# CHAPTER 5
## SETUP PROGRAM

AT-compatible computers store hardware configuration information in a battery-maintained area of memory called "CMOS." To enter or change this information, you run a program called "SETUP."

## CompuAdd Computers

SETUP operation depends on the brand of BIOS that you have. To find out your BIOS brand, boot your computer. The screen displays the brand (and version) of BIOS every time you turn on or reset the computer.

### Phoenix BIOS

At the DOS prompt, press the **Ctrl-Alt-Esc** keys simultaneously. This should cause the SETUP screen to appear. Use the up and down arrow keys to move through the list. Highlight the type number for the first and/or second drive (depending on whether you installed a first or second IDE drive). Then use the left or right arrow keys to select drive type number for your drive.
WDAC140 - 17
WDAC160 - 19
WDAC280 - 16
WDAC2120 - 20

If your drive type is not available, use 48 or 49. These are programmable selections that allow you to enter values for your specific drive requirements. Refer to Appendix A for drive specifications.

Follow the on-screen instructions to save the new information.

**Caution**
**If you are using Novell Netware 286, you cannot select a programmable drive type (types 48 and 49). Use a disk management program (such as ONTRACK) to setup and access your drive.**

Award BIOS

Turn on or reset the computer. When the self-test procedure ends, press the **Ctrl-Alt-Esc** keys simultaneously. This should cause the SETUP screen to appear. If it does not, reset the computer and press the **Ctrl-Alt-Esc** keys simultaneously during the self-test. Use the up and down arrow keys to move the highlight to the type number for the first and/or second drive (depending on whether you installed a first or second IDE drive). Then use the left or right arrow keys to select your correct drive type as specified under "PHOENIX BIOS." Follow the on-screen instructions to save the new information.

## Other AT-Compatible Computers

In AT-compatible computers, the system BIOS uses a drive type table to store a set of fixed disk drive characteristics. Each drive type in the table has a number assigned to it. The computer uses the number to look up the characteristics from the table. Ordinarily, AT-compatible computers running DOS can only use fixed disk drives for which they have a type number. Your computer model or a similar model may not appear in the table. In this case, choose a drive type number that is closest to your drive size without being larger than the actual drive capacity.

## What to Do Next

The final stage in the drive installation process is to prepare your drive to store data and programs. If you will be using DOS 3, turn to Chapter 6. If you will be using DOS 4 or later version, turn to Chapter 7.



# CHAPTER 6

## PREPARING THE DRIVE USING DOS 3

This chapter explains preparing your IDE drive using MS-DOS or PC-DOS, version 3.3. If you are using other DOS 3 versions, refer to your DOS manual

Versions of DOS prior to 3.3 do not support fixed-disk drive partitions greater than 32 MB and are not recommended for use with your new drive. Versions of DOS prior to 3.0 do not work reliably with hard drives greater than 16 MB and are not recommended for use with your new drive.

## Overview

Before a new IDE drive can store programs or data, it must go through three stages of preparation:

- Low-level formatting, which marks off and identifies sectors on the drive
- Partitioning, which divides the drive into one or more areas for use by one or more operating systems
- High-level formatting, which organizes the drive for information storage under operating system control.

CompuAdd performs low-level formatting and marks off disk surface defects for you. You need to partition and high-level format your drive to complete the installation.

## Preparing the First IDE Drive

You use the DOS program FDISK.COM to partition the drive, and the FORMAT.COM program to high-level format it.

### 1. Partition the new drive.

DOS 3.3 allows a maximum of 32 MB per partition. You'll divide the drive into two partitions and create a second logical drive letter for the second partition.

After you have finished installing your IDE drive, put your DOS Program Disk in the A: drive and turn on your computer. At the "A:>" prompt, pressing **[Enter]** twice to get past the time and date questions if necessary. Type "**FDISK**" and press **[Enter]**.

From the five-choice menu, choose "1. Create DOS Partition" by pressing **1 [Enter]**.

When the next menu appears, press **[Enter]** to choose "1. Create Primary DOS Partition."

The program will then ask:

```
Do you wish to use the maximum size for a
DOS Partition
(Y/N).....................? [Y]
```

Press **N [Enter]**. (If you enter "Y," you will not be able to create an extended partition to use the capacity of the drive in excess of 32 MB.)

FDISK will ask you the size of the partition to create in cylinders. You can accept the 32 MB choice by pressing **[Enter]**. Then return to the main menu by pressing the **[Esc]** key.

Choose the "1. Create DOS Partition" option again by pressing **1 [Enter]**.

When the next menu appears, press **2 [Enter]** to choose "2. Create Extended DOS Partition."

FDISK will ask you the size of the partition to create in cylinders, with a predefined choice equal to the remaining space on the drive. You can accept this choice by pressing **[Enter]**. Then press the **[Esc]** key. FDISK will now prompt you to create a logical drive





(or drives) in the extended partition. You can just press **[Enter]** to accept the predefined choices.

When you finish assigning the logical drive letter(s), press [Esc] to return to the main menu. Now press **2 [Enter]** to "Change Active Partition." When asked which partition to activate, press **1**. Then press [Esc] to leave FDISK.

### 2. High-level format the new drive.

Your first fixed disk drive will automatically be assigned to the letter "C:" whether you have one or two diskette drives.

Boot your computer using a DOS Program Disk. Make sure it is the same DOS version that you plan to install on your IDE drive.

At the "A:>" prompt, type **FORMAT C: /S** and press **[Enter]**. The program will give you a warning message, and ask you if you really do want to format drive X:. Assuming that the drive letter shown is your new drive, press **Y [Enter]**.

Formatting may take up to an hour or so. The FORMAT program will show you the head and cylinder numbers of the tracks that it is currently formatting. Do not be alarmed if this progress occasionally halts while the program checks for bad clusters.

The "/S" at the end of FORMAT will copy the DOS system files (COMMAND.COM and two hidden files) from the diskette to the IDE drive after the formatting is finished. If you want the system to boot from the IDE drive, you must use FORMAT C:/S or SYS C: to transfer the DOS system files before copying anything else to the IDE drive.

Now run the high-level format on the D: drive (and any additional logical drives you created). At the "A:>" prompt, type **FORMAT D:**, press **[Enter]**, and then press **Y [Enter]**.

When all of the high-level formatting is finished, the IDE drive is ready to use, but you should verify that the computer will boot from the IDE drive before proceeding. Take the diskette out of the A: drive, turn the computer off, wait 5 seconds, and then turn it back on again. Press **[Enter]** twice to bypass the date and time questions. You should be at a "C: >" prompt. If you are not, turn to Appendix B for troubleshooting instructions.

### 3. Copy the DOS programs to the IDE drive.

If you are not experienced with DOS, follow these steps to install DOS on your IDE drive:

1. Boot the system. You should be at the "C: >" prompt.

2. Type the following lines, ending each line by pressing **[Enter]**:

```
CHDIR \
COPY CON AUTOEXEC.BAT
PATH C:\DOS
PROMPT $P$G
```

3. Press the **[F6]** key and press **[Enter]**. Then type the following lines, ending each line by pressing **[Enter]**:

```
COPY CON CONFIG.SYS
BUFFERS=20
FILES=20
```

4. Press the **[F6]** key and press **[Enter]**. Then type the following lines, ending each one with a press of the **[Enter]** key:

```
MKDIR \DOS
CD \DOS
```

3. Put in each DOS diskette and enter the following line:

```
COPY A:*.*
```

You have finished preparing your new IDE drive and installing DOS.





## Preparing a Second IDE Drive

This section assumes that you have already installed DOS on your first IDE drive. You will be using the DOS program FDISK.COM to partition the drive, and then the FORMAT.COM program to high-level format it.

### 1. Partition the new drive.

After you have finished installing your second IDE drive, turn on your computer. At the "C: >" prompt, type "**FDISK**" and press **[Enter]**.

You should see a menu with five choices on it. Above it should be:

```
Current fixed disk drive: 1
```

You should change to the second drive by pressing **5 [Enter]**.

Now the screen should read:

```
Current fixed disk drive: 2
```

Choose the "1. Create DOS Partition" option by pressing **1 [Enter]**.

When the next menu appears, press **[Enter]** to choose "1. Create Primary DOS Partition."

The program will then ask:

```
Do you wish to use the maximum available
size for a DOS Partition
(Y/N).....? [Y]
```

Press **N [Enter]**. (If you enter "Y," you will not be able to create an extended partition to use the capacity of the drive in excess of 32 MB.)

FDISK will ask you the size of the partition to create in cylinders. You can accept the 32 MB choice by pressing **[Enter]**. Then return to the main menu by pressing the **[Esc]** key.

Press **1 [Enter]** to choose "1. Create DOS Partition."

When the next menu appears, press **2 [Enter]** to choose "2. Create Extended DOS Partition."

FDISK will ask you the size of the partition to create in cylinders, with a predefined choice equal to the remaining space on the drive. You can accept this choice by pressing **[Enter]**. Then press the **[Esc]** key. FDISK will now prompt you to create a logical drive (or drives) in the extended partition. You can just press **[Enter]** to accept the predefined choices. When you finish assigning the logical drive letter(s), press **[Esc]** to leave FDISK.

### 2. High-level format the new drive.

Your new IDE drive's partitions will automatically be assigned to the next available letters of the alphabet. If you are unsure which letters access your new drive, try entering "**DIR X:**" where "X" stands for "D" through "G." Requesting a directory using a new drive letter should not cause an "invalid drive" error, but the directory displayed will be nonsense until the drive is formatted.

At the "C:>" prompt, type "**FORMAT X:**" where "X" is the letter of the primary partition on the new drive, and press **[Enter]**. The program will give you a warning message, and ask you if you really do want to format drive X:. Assuming that the drive letter shown is your new drive, press **Y [Enter]**. Repeat this process for each logical drive in the extended partition.

Formatting may take up to an hour or so, depending upon the individual characteristics of your IDE drive. The FORMAT program will show you the head and cylinder numbers of the tracks that it is currently formatting. Do not be alarmed if this progress occasionally halts while the program checks for bad clusters.

When all of the high-level formatting is finished, your new IDE drive is ready to use.



# CHAPTER 7

## PREPARING THE DRIVE USING DOS 4

## Overview

Before a new fixed disk drive can store programs or data, it must go through three stages of preparation:

- Low-level formatting, which marks off and identifies sectors on the drive
- Partitioning, which divides the drive into one or more areas for use by one or more operating systems
- High-level formatting, which organizes the drive for information storage under operating system control.

The low-level formatting has already been done on your IDE drive at the factory, and any disk-surface defects have been marked off as unusable. The partitioning and high-level formatting must still be done.

## Preparing the First IDE Drive

If you are preparing a second IDE drive, and already have an IDE drive in your system with DOS installed on it, skip to the section in this chapter on "**Preparing a Second IDE Drive.**"

If you are preparing the first fixed disk drive in your computer, DOS 4 includes an installation program that will do the following for you:

- Partition the fixed disk drives in the computer
- High-level format the fixed disk drives in the computer

- Create a CONFIG.SYS file on the first fixed disk drive
- Create an AUTOEXEC.BAT file on the first fixed disk drive
- Copy the DOS program files from diskettes to a subdirectory on the first fixed disk drive.

To run the DOS 4 installation program:

1. Turn your computer off.

2. Locate the set of DOS diskettes, and put the INSTALL diskette in the drive A.

3. Turn your computer on.

4. Follow the instructions on your screen.

You will be asked to insert various diskettes from the set of DOS diskettes, and then press **[Enter]** to continue.

> Note: the SELECT diskette and the SELECT COPY diskette are different diskettes, despite their similar names. Please read the screen carefully, and insert the diskette called for. Many people confuse these two diskettes during DOS installation.

When you are asked to make a choice, simply press **[Enter]** to accept the predefined choice. These predefined choices were chosen by the programmers to meet the needs of most computer users. Unless you are sure that you need to make another choice, accepting the predefined choices will give you the best configuration.

The DOS 4 installation program will automatically partition the first IDE drive for you. After the program has copied the INSTALL diskette onto the SELECT COPY diskette, a message like the following will appear on your screen:





```
Partition Fixed Disk 1.
Let SELECT define partition sizes
```

Press **[Enter]**. After a few minutes of disk activity, the following message should appear:

```
You must restart your computer to con-
tinue.
```

If this message doesn't appear within five minutes, go ahead and restart your computer. Press the "Ctrl," "Alt," and "Del" keys simultaneously to reboot your computer, or simply turn it off and then back on again. After it finishes booting up, the computer will display the following message on its screen:

```
Insert SELECT diskette in drive A:

Press Enter to continue installing DOS,
or press Esc to exit.
```

Put in the SELECT disk and press **[Enter]**. The following instruction will appear:

```
Insert SELECT COPY diskette in drive A
```

Insert the SELECT COPY diskette and press [Enter]. The DOS "high-level" format of the IDE drive will begin with this message:

```
Formatting disk . . .
```

Formatting may take up to an hour or so, depending upon the individual characteristics of your fixed disk drive. The FORMAT program will show you the percentage of the drive that it has formatted. Do not be alarmed if this progress is occasionally halted while the program is "attempting to recover allocation unit." It is normal for a fixed disk drive to have some bad tracks, and the DOS format program will thoroughly test each allocation unit (cluster) on a bad track to see if it is usable, even though the entire track may have

been marked bad previously during the low-level format.

## Preparing a Second IDE Drive

Since you have already installed DOS 4 on your first IDE drive, you do not have to go through the entire DOS installation procedure again. You will be using the DOS program FDISK.EXE to partition the drive, and then the FORMAT.COM program to high-level format it.

### 1. Partition the new drive.

After you have finished installing your second IDE drive, turn on your computer. At the "C:>" prompt, type "**FDISK**" and press **[Enter]**.

You should see a menu with five choices on it. Above it should be:

```
Current fixed disk drive: 1
```

You should change to the second drive by pressing **5 [Enter]**.

(If you are not given the option of selecting the next fixed disk drive, then the computer is not recognizing the second drive. Appendix B has instructions for checking the installation.)

Now the screen should read:

```
Current fixed disk drive: 2
```

Choose the "1. Create DOS Partition or Logical Drive" option by pressing **1 [Enter]**.

When the next menu appears, press **[Enter]** to choose "1. Create Primary DOS Partition."

The program will then ask:





```
Do you wish to use the maximum available
size for a Primary DOS Partition
(Y/N).....? [Y]
```

Press **[Enter]**. FDISK will reserve the entire drive for use by DOS, and then prompt you to reboot the system.

### 2. High-level format the new drive.

Your second IDE drive should have been assigned to the letter "D:" when you rebooted at the end of Step 1. Try entering "**DIR D:**" before formatting the new drive. The directory of the new drive will be nonsense until it is formatted.

At the "C:>" prompt, type "**FORMAT D:**" and press **[Enter]**.

The program will give you a warning message, and ask you if you really do want to format drive X:. Assuming that the drive letter shown is your new drive, press **Y [Enter]**.

Formatting may take up to an hour or so, depending upon the individual characteristics of your fixed disk drive. The FORMAT program will show you the percentage of the drive that it has formatted. Do not be alarmed if this progress is occasionally halted while the program is "attempting to recover allocation unit." It is normal for a fixed disk drive to have some bad tracks, and the DOS format program will thoroughly test each allocation unit (cluster) on a bad track to see if it is usable, even though the entire track may have been marked bad previously during the low-level format. When the high-level format is finished, the IDE drive is ready to use.

NOTE: The best prevention against the loss of your valuable programs and data is frequent backup.

# Appendix A

## WDAC IDE Drives SPECIFICATIONS

| WDAC IDE Drive | 140 | 160 | 280 | 2120 |
|---|---|---|---|---|
| **Drive Type** | 17 | 19 | 16 | 20 |
| **Formatted Capacity** | | | | |
| Per Drive | 42.7 MB | 62.5 MB | 85.3 MB | 125 MB |
| Per Surface | 21.3 MB | 3.1.25 MB | 21.3 MB | 31.25 MB |
| Per Cylinder | 39424 B | z1 =48640 B<br>z2 =40448 B | 78848 B | z1 =972802 B<br>z2 =80896 B |
| Per Track | 19712 B | z1 =24576 B<br>z2 =20480 B | 19712 B | z1 =24576 B<br>z2 =20480 B |
| Per Sector | 512 B | 512 B | 512 B | 512 B |
| Physical Sectors/Trk | 39 | z1 = 48<br>z2 =40 | 39 | z1 =48<br>z2 =40 |
| Sectors/Drive | 83314 | 122091 | 166628 | 244182 |
| **Physical Specifications** | | | | |
| Data Cylinders | 1082 | z1 =970<br>z2 =379 | 1082 | z1 =970<br>z2 =379 |
| Data Heads | 2 | 2 | 4 | 4 |
| Data Surfaces | 2 | 2 | 4 | 4 |
| Disks | 1 | | 2 | 2 |

**Functional Specifications**

| | |
|---|---|
| Rotational Speed | 3595±0.1% RPM |
| Track Density | 1,405 tpi |
| Interleave | 1:1 |
| Encoding Method | 2,7 RLL |
| Head Actuation | Rotary Voice Coil |
| Head Parking | Automatic |

**Performance Specifcations**

| | | |
|---|---|---|
| Single Track Seek | 6 | ms maximum |
| Average Seek Time | <18 | ms |
| Maximum Seek Time | 28 | ms |
| Average Latency | 8.34 | ms |
| Data Transfer Rate | | |
| Buffer to Disk | 12.0 | Mbits/sec |
| Buffer to Host | 4.5 | Mbytes/sec |

**Reliability Specifications**

| | | |
|---|---|---|
| MTBF | 50,000 | hours (poh) |
| Preventative Maintenance | none | |
| Component Life | 5 | years |
| Soft Read Errors | 1 | in $10^{10}$ bits read |
| Hard Read Errors | 1 | in $10^{12}$ bits read |

**Power Requirements**

| | | |
|---|---|---|
| +12 Volts DC ±5% | | |
| Typical | 0.37 | A |
| Start-up | 1.40 | A maximum |
| +5 Volts DC ±5% | | |
| Typical | 0.18 | A |
| Maximum | 0.25 | A |
| Power Dissipation | | |
| Idle | 5.4 | watts |
| Maximum | 13.9 | watts |
| AC Voltage | not required | |

**Physical Dimensions (without brackets)**

| | | |
|---|---|---|
| Height | 1.00 in | 25.4 mm |
| Width | 4.00 in | 101.6 mm |
| Length | 5.75 in | 146.1 mm |
| Weight | 1.12 lb | 0.50 kg |



# Appendix B

## TROUBLESHOOTING

**WARNING**

**Hazardous voltages are present when operating the computer with the cover removed. To prevent equipment damage and personal injury, replace the cover before turning on your system.**

## If Your Drive Fails to Work Initially

### Check for Conflicting Components

If you have a separate fixed disk drive controller board in one of your computer's expansion slots, remove the board (with the power off, of course) and try your IDE drive again.

In most cases, an AT-compatible computer can have a maximum of two fixed disk drives. If one drive is an IDE drive, the other drive should also be an IDE drive.

### Check the Drive Installation

Follow these steps to make sure that your new drive is installed correctly:

1. Switch off your computer and unplug its power cord.

2. Remove the computer system unit cover.

3. Carefully check all of the IDE drive cables again.

   - Is the power connected to the drive?
   - Are the colored edges of the ribbon cables oriented correctly?
   - Do the IDE cable connectors cover all forty pins on both ends?

4. Using your system manual, carefully check your computer system board to make sure that its IDE interface is set up correctly.

6. If the above steps do not solve the problem, repeat the drive preparation procedure, starting with FDISK.

## If Your Drive Stops Working Properly After Installation

If you moved the computer or took off its cover before the problem occurred, you may have loosened a cable. Follow the above instructions to check cable connections.

### Failure to Boot

If your computer stops booting up from the IDE drive, try the following:

1. Boot up the computer from the first DOS diskette (for DOS 4, use Install and press the **[Esc]** key to leave the installation process).

2. At the "A:\" prompt, type these two lines:

SYS C: **[Enter]**
COPY COMMAND.COM C: **[Enter]**

3. Remove the diskette from the A: drive and restart the computer. If it fails to boot from the IDE drive again, run the FDISK program again and make sure that the primary partition on the first fixed disk drive is marked "**Active**."

### Fixed Disk Drive Errors

Many fixed disk drive errors are caused by scrambled files. Files can become scrambled when the computer loses power while it is writing to the drive, when memory resident programs interfere with other





programs, or when a program simply fails to manage a given file correctly.

In some cases, scrambled files may be impossible to recover, but the overall integrity of the fixed-disk drive's file structure can be restored by running DOS's CHKDSK/F command. See your DOS manual for more details.

**CAUTION**
**Do not ever run the DOS program RECOVER on your drive. It usually does more harm than good to your data.**

In general, the error messages you see on your screen come from your software program or operating system. To identify the source of a suspected drive problem, write down any error messages that appear on your screen and look for them in the documentation for your software program, operating system, and computer system. If you require technical assistance, reporting these error messages and the exact circumstances under which they occurred will help the technicians diagnose and solve the problem.

The best prevention against the loss of your valuable programs and data is frequent backup.